

**REMARKS**

Applicants appreciate the consideration shown by the Office as evidenced by the Office Action mailed on May 7, 2004. In that Office Action, the Examiner rejected claims 1-12, 31, 32, 34-48, 64, 65, 67, 68, 70-78, 102-117, 133, 134, 136, 137, 139 and 140, and objected to claims 13-30, 33, 49-63, 79-101, 118-132, 135, and 138. In this Response, Applicants have amended claims 104, 116, 118, 121, 123, 124, 127, 134, 135, 137, and 138; and have cancelled claims 115, 120, 133, and 136. Applicants respectfully request reconsideration of the application by the Examiner in light of the following remarks offered in response to the Office Action.

**1. Claim Rejections – 35 USC § 102****A. Lee et al. (U.S. Pat. No. 5,738,491)**

Claims 1-4, 6-12, 28, 34-35, 37-39, 40, 43-47, 65, 67, 70-71, 73-74, 77-78, 102, 104-105, 107, 108, 109, 112-116, 133, 136 and 139 were rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. (U.S. Pat. No. 5,738,491; herein referred to as '491). Applicants respectfully traverse this rejection and request reconsideration.

As to independent claims 1 and 35 drawn to a method for repair of a gas turbine blade; and claims 37 and 71, drawn to a method for manufacturing a gas turbine blade, Applicants respectfully submit that '491 does not anticipate the limitation of "providing at least one freestanding tip insert," as recited by each of the aforementioned claims of the present application. Applicants have provided a reference for the definition of freestanding in the previous Response for this case. The methods discussed for manufacturing the blade of '491 at col. 5, lines 23-30, include nothing that teaches, suggests, or discloses a freestanding insert. Instead, '491 discusses filling the channel 60 in the tip 54 a,b by means of plasma deposition or melting the material into the channel to form conductor 58. In all cases, the methods discussed by '491 involve starting with a solid raw material (powder or ingot, respectively) that is not an insert, melting the raw material, filling channel 60 with molten metal, and allowing the liquid to solidify within channel 60. Neither of these processes involves disposing a freestanding insert onto the blade, as is recited in the claims at issue in the present application. '491 is highly concerned with maintaining high thermal conductivity between the conductor 58, the tips 54a,b, and the coolant 52; and the solidification methods described above are well suited for that application. Contrary to the

Examiner's remarks, '491 is silent on the issue of using particular methods of joining a freestanding insert to the blade body using, for example, methods such as welding, brazing, or diffusion bonding. Such methods would potentially introduce undesirable thermal resistances in the invention of '491, and thus the silence of '491 on these methods is not surprising. Applicants therefore respectfully submit that independent claims 1, 35, 37, and 71, and their respective dependent claims, are patentably distinct from '491.

As to claims 73 and 102, directed to "a freestanding tip insert," Applicants respectfully submit that these claims are also patentably distinct from '491 because, as discussed above, '491 does not teach, suggest, or disclose a freestanding insert. '491 merely describes a turbine blade having a tip made of multiple materials, and the tip is made by solidifying molten metal within channel 60. No fair reading of '491 would construe conductor 58 as a freestanding insert as recited in the instant claims at issue. Applicants respectfully submit that claims 73 and 102 and their respective dependent claims are patentably distinct from '491.

As to claims 104 and 139, drawn to a turbine blade, Applicants respectfully submit that '491 does not anticipate the materials selection limitations recited in these independent claims. The Examiner's remarks notwithstanding, '491 states only one guideline for materials selection for conductor 58: the material "has a substantially greater thermal conductivity" than the material comprising the squealer tips 54a,b, and the only specific example given is nickel aluminide. Col. 4, lines 45-57. There is no teaching, suggestion, or disclosure of any of the materials recited in claims 104 and 139 of the present application. For example, directionally solidified eutectics, oxide dispersion strengthened materials, and so forth, do not necessarily have substantially higher thermal conductivity than traditional blade materials and thus would not qualify as suitable materials for the '491 blade. Moreover, Applicants clearly describe in paragraphs 0034-0043 of the present specification that in many instances the materials used in making the turbine blade recited in claims 104 et seq. are stronger and have higher creep rupture strength than the superalloys commonly used to make conventional blade, while '491 goes on to say that the materials used for conductor 58 are very brittle and are subject to damage due to their low ductility. Col. 4, lines 58-65. Clearly the materials described in '491 are quite different from the materials recited in claims 104 and 139. Because '491 fails to teach, suggest, or disclose the use of

materials recited by claims 104 and 139, Applicants respectfully submit that these claims and their respective dependent claims are patentably distinct from '491.

#### **B. Ferrigno et al. (U.S. Pat. No. 5,856,057)**

Claims 104 and 106 were rejected under 35 U.S.C. 102(b) as being anticipated by Ferrigno et al. (U.S. Pat. No. 5,856,057; herein referred to as '057). Applicants respectfully traverse this rejection and request reconsideration.

Claim 104 recites specific materials to be used for the second material. In stark contrast, '057 merely states that the materials used to repair damaged tips are the same materials used to construct the blades (i.e., conventional superalloys based on nickel or cobalt). As '057 does not teach, suggest, or disclose all of the limitations of claim 104, Applicants respectfully submit that claim 104 and its dependent claim 106 are patentably distinct from this reference.

### **2. Claim Rejections – 35 USC § 103**

#### **A. '491 in view of Lee et al. (U.S. Pat. No. 5,348,446)**

Claims 5, 41, 75, and 110 were rejected under 35 USC § 103(a) as being unpatentable over '491 in view of Lee et al. (U.S. Pat. No. 5,348,446; hereafter '446). Applicants respectfully traverse this rejection and request reconsideration.

Each of these claims depends from an independent claim believed to be allowable for the reasons described above. Applicants respectfully submit that these claims are therefore allowable because each depends from an allowable independent claim.

#### **B. '491 in view of Arnold (U.S. Pat. No. 6,049,978)**

Claims 12, 31-32, 36, 42, 48, 68, 72, 76, 103, 117, 134, 137, and 140 were rejected under 35 USC § 103(a) as being unpatentable over '491 in view of Arnold (U.S. Pat. No. 6,049,978; hereafter '978). Applicants respectfully traverse this rejection and request reconsideration.

Independent claims rejected under this combination of references include claims 36, 72, 103, and 140.

Claim 36 recites a method for repair of a gas turbine blade, comprising, *inter alia*, providing at least one freestanding tip insert, said at least one tip insert comprising a material

selected from the group consisting of rhodium, platinum, palladium, and mixtures thereof. Applicants have already pointed out, above, that '491 does not teach, suggest, or disclose the use of a freestanding insert to make a repair. '978 does not overcome this deficiency. '978 merely describes the use of a "high density coating process" like HVOF to deposit the repair material. Again, a coating cannot be freestanding by definition, because it always exists as a layer supported by a substrate. Moreover, '978 does not teach, suggest, or disclose that the material can or should be a material selected from the group consisting of rhodium, platinum, palladium, and mixtures thereof. The material in '978 is merely described as a metal alloy capable of forming a diffusion bond with the substrate. Col. 14, lines 19-21. The only specific example given is a superalloy INCO 713C, which comprises none of the materials recited in claim 36. As neither '491 nor '978, alone or in combination, teaches, suggests, or discloses the use of a freestanding insert and an insert comprising the materials recited in claim 36, Applicants respectfully submit that this claim is patentably distinct from these references.

Claim 72 recites a method for manufacturing a gas turbine blade, comprising, *inter alia*, providing at least one freestanding tip insert, said tip insert comprising a material selected from the group consisting of rhodium, platinum, palladium, and mixtures thereof. As above, neither reference teaches, suggests, or discloses the use of a freestanding insert, nor do they remotely mention the use of the materials recited in the instant claim. Applicants respectfully submit that this claim is also allowable over the applied combination.

Claim 103 recites a freestanding insert comprising a material selected from the group consisting of rhodium, platinum, palladium, and mixtures thereof. For the same reasons as described above, Applicants submit that this claim is patentably distinct over the applied combination of '491 and '978.

Claim 140 recites a turbine blade comprising a turbine blade body and a blade tip; wherein said blade tip comprises at least one tip insert joined to said blade body, said at least one tip insert comprising a material selected from the group consisting of rhodium, platinum, palladium, and mixtures thereof. Again, there is no mention in either reference about the use of materials comprising these platinum group metal elements. In fact, '491 describes the use of high conductivity materials such as nickel aluminide (col. 4, lines 45 et seq.) and '978 merely gives an example where the tip and the blade are made of the same

material. As neither reference teaches, suggests, or discloses the use of the material recited in claim 140, Applicants submit that this claim is allowable over the applied combination.

The other claims rejected under this combination of references are dependant from base claims that Applicants believe are allowable, for reasons described above. Applicants therefore respectfully submit that these claims are allowable because each depends from an allowable base claim.

### **3. Claim Objections—Allowable Subject Matter**

Applicants appreciatively note the Examiner's remarks as to the recital of allowable subject matter by the claims objected to in the current Office Action, listed above.

Applicants believe these claims all depend from base claims that are allowable over the applied prior art, and thus respectfully submit that these claims should be allowable as they stand.

### **4. Conclusion**

In light of the remarks presented herein, Applicants submit that the case is in condition for immediate allowance and respectfully request such action. If, however, any issues remain unresolved, the Examiner is invited to telephone the undersigned at the number provided below.

Respectfully submitted,



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